Pronominal Case Judgment and Verb Finiteness Marking in Children with Specific Language Impairment

A Senior Honors Thesis

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by

Madelaine Heath

The Ohio State University

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Project Advisors: Dr. John Grinstead, Department of Spanish and Portuguese

Dr. Robert Fox, Department of Speech and Hearing Sciences

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Abstract

There has been some success has been made in diagnosing children with SLI on the basis of difficulties that they have with verb tense, or finiteness (Rice & Wexler 1996). Other work (e.g. Schütze & Wexler 1996) has shown that verb finiteness and pronominal case marking in subject position correlate in typical child language development, i.e. children tend to produce pronominal case errors with nonfinite verbs (e.g. *Him dance.* vs. *He dances.*). This finding holds the promise that children's case errors could be an effective means of diagnosing SLI, which is corroborated with productive language evidence in Wexler, Schütze & Rice (1998). More recently, Donnellan (2010) has shown that children's judgments of pronominal case errors (e.g. She is a turtle. vs. Her is a turtle.) correlate with their judgments of verb finiteness (e.g. He dances. vs. He dance.), with age partialed out. However, this previous research has failed to show that this between finiteness and case does not exist simply because all language develops simultaneously.

To that end, this experiment combined pronominal case, verb finiteness and a theoretically unrelated aspect of grammar, the Binding Principles, on one receptive test. The results showed that pronominal case and verb finiteness correlate, while neither case nor finiteness correlates with Binding Principle. Thus, because it was shown that not all aspects of language develop together, the unique relationship between pronominal case and verb finiteness is confirmed.

The Binding Principle Test was administered first. Each item on this test contained a picture and two corresponding sentences, one adult-like in nature and the other child-like, each uttered by a different puppet. The child was asked to judge which puppet "said it better". This test included 53 children, of which 43 of who qualified to be included in our data. A second test,which included all three aspects of language (verb finiteness, case and the Binding Principle), was administered using the same format. The second test was given to 44 children.

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Chapter 1: Introduction and Literature Review

Specific language Impairment (SLI) is a language disorder that manifests itself in around five percent of children (Leonard, 1997). A diagnosis of SLI is given when a child exhibits a severe deficit in expressive language, but has no accompanying disorder that would explain the presence of this deficit, such as mental retardation, brain damage, or a hearing impairment (Leonard). That is to say that SLI is diagnosed mostly by means of exclusionary measures—not by what symptoms the child does exhibit, but rather what symptoms the child does not exhibit and through the process of elimination of disorders that child is proven not to have. Needless to say, this process is not the quickest or most reliable diagnostic process. To that end, this study aspires to provide data that will help diagnose SLI with more efficiency and accuracy, allowing children with SLI to receive crucial intervention at an earlier age.

Earlier work has shown that in typically-developing children, judgments of verb finiteness correlate with judgments of subject pronominal case marking (Donnellan 2010) and with judgments of subject auxiliary inversion in questions (Ricci 2009)[1]. While this correlation is interesting, the evidence for a connection between verb finiteness and case would be much stronger if we were able to show that the development of verb finiteness did not correlate with all aspects of English grammar. My project will aim to do just that using the Grammaticality Choice test format (Pratt & Grinstead 2007) to test children's knowledge of the syntactic structural constraints on pronoun and reflexive coreference. Given that there is no theoretical connection between verb finiteness and pronoun

[1] I will not address the connection between verb finiteness and subject-auxiliary inversion in this project.

coreference, I predict that they should not correlate, thus demonstrating the uniqueness of the correlation between the development verb finiteness and case.

Section 1.0 Statement of Problem

The errors that children make in case assignment have been a topic of interest for many years, with Gruber publishing early work in 1967. In his study, as in the majority of subsequent studies, Gruber notes that the frequency of case errors in children is asymmetric. That is to say that errors in the subject position are frequently seen, whereas errors in the object position are rarely seen. Since the observation of this phenomenon was documented there have been many subsequent attempts to explain it. Tanz (1974) proposes that perhaps the noted asymmetry is due to the fact that in English nominative case pronouns occur much less frequently than accusative case pronouns. Rispoli (1994,1995), (using data from Hart 1991) proposes a further asymmetry in which pronoun forms are used incorrectly, specifically, that non-nominative pronouns are used incorrectly with a much higher frequency than nominative pronouns, as illustrated in Table 1 from Rispoli (1994), as cited in Schütze, 1997. Schütze (1997), commenting on Rispoli, notes that the environments in which these errors occur are asymmetric, with a much higher presence errors in subject environments being observed than errors in possessor environments.

Correct form	NOM	non-NOM	% of environments
NOM	13,298	1,242	91%
non-NOM	52	6,263 correct 53 errors	98%
%correct usage	99.6%	83%	94%

Table 1 - Summary of 12 children's pronoun case usage in English, ages 1;0-3;0 (Schütze, 1997, p. 219, Table 4)

The idea that subject case may correlate with verb finiteness in child English has also been a topic of much study, again with Gruber (1967) making the first attempt to find an explanation. He notes that a when a particular child (2;2-2;5) utters a sentence with a non-NOM subject, the copula is always omitted. However, with a NOM subject the copula could be present or absent. Loeb and Leonard (1991) produce another important study on this topic, examining third person singular pronouns and verbs that take –s. In this study they make the influential observation that, when one outlying child is excluded, non-NOM subjects do not occur with inflected verbs.

Subject	Inflected	Uninflected
he+she	436	75
him+her	4	28
Percent non-NOM	0.9%	27%

Table 2 - Finiteness verses case for 7 (of 8) of Leob and Leonard's (1991) normal subjects, (Schütze 1997, p. 222, Table 6)

In sum, the following conclusions can be drawn from previous studies on child case errors: (1) Children do not appear to produce case errors in object position and produce few in the subject position and (2) nonNOM subjects are hardly ever produced with agreeing verbs and occur often with uninflected verbs.

Section 1.1 Generative Approaches to the Problem

A satisfactory solution to the problem of why child English speakers consistently produce non-Nom case pronouns in the subject position, (producing instead Accusative or Genitive case) still had no answer. To this end, Schütze and Wexler (1996) present the Agreement-Tense Omission Model (ATOM). They begin with the idea, following Akmajian (1984), that all languages have a default case, proposing that while in the other languages studied, nominative appears as the default case, as in the German examples in (3), English instead uses the accusative (4).

(3) a. Was? Ich/ *Mich dich betrugen? Nie!

What? I/*me cheat on you? Never!

b. Der, den habe ich gesehen

He, him I saw

(4) a. Me/*I, I like beans.

b. Who did it? –Me/*I

c. Me/*I too

d. It's us/*we

e. What? Me/*I cheat on you? Never!

Schütze and Wexler (1996) also propose a strong separation between morphological case and structural licensing. That is to say that the position assigned to overt NPs is independent of the assignment of morphological case features. They also make the crucial assumption that Agreement, not Tense, assigns nominative case and propose that the the following combinations of syntactic features and morphological realizations:

Syntactic features	Description	Morphological Expression
a. [+tns, +agr]	NOM assigned	he cries
b.[+tns, -agr]	NOM unassignable, default ACC	he cries
c.[-tns, +agr]	NOM assigned, agreement invisible	he cry
d.[-tns, -agr]	NOM unassignalbe, GEN assigned	my cry, my crying

In order to test the ATOM proposal, Schütze and Wexler use spontaneous production data for three children, Nina, Peter and Sarah (Tables 3 and 4), taken from the Suppes (1974), Sachs (1983) and Brown (1973) corpora, taken from the CHILDES Data Base (MacWhinney 2000). The results of their study of the contingency between finiteness and case are illustrated in the following tables.

Subject	Finite verb form	-Finite verb form
he+she	255	139
Him+her	14	120
%non-Nom	5%	46%

Table 3 - Finiteness versus case (Nina 3 sg) from Schütze & Wexler (1996, p. ,647 Table 5

Subject	Finite verb form	-Finite verb form
she	21	24
her	3	14
%non-Nom	13%	37%

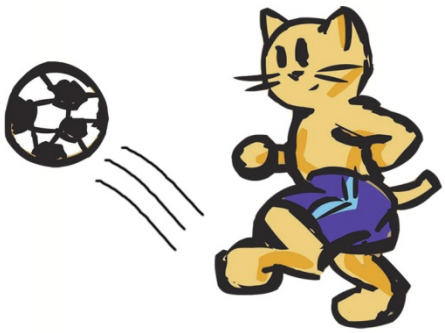
Table 4 - Finiteness verses case (Sarah, 3sgf) from Schütze & Wexler (1996, p. 676, Table 10

It is notable that Nina produces 46% of her non-Nom (non-nominative) subject pronouns with non-finite verbs, while only 5% with finite verbs. Sarah echoes this effect with 37% of her non-Nom occurring with non-finite verbs and only 13% with finite. From this data, Schütze and Wexler draw the conclusion that non-Nom subjects rarely occur with inflection, providing evidence that children know that nominative case must be used when a verb shows agreement.

Donnellan (2010) aims to further dissect the possible link between verb inflection and pronominal case in child English speakers. Her study also aims to provide answers to whether the generative or constructivist accounts provide a more accurate theory into child language development. In order to answer these questions, three tests are performed on typically-developing children. The children are first expected to pass unrelated filler items to make sure they understand the format of the tests. The tests included a Verb Finiteness Task, a Pronoun Case Task, and a Case-Finiteness task and consisted of the child listening to two puppets' utterances about a picture and then being asked to make grammaticality judgments about which puppet said it correctly. The underlying assumption in this work, following Pratt & Grinstead (2007), is that children's receptive grammars should be reflected in their judgments, just as in their productions. A methodologically important aspect of this design is that the verbs on the Verb Finiteness test were marked with past tense –ed and auxliary be. Subject pronouns were always nominative. On the pronoun test, verbs were always finite and were marked with third singular –s and copula be. In this way, finiteness is held constant on the pronoun test and pronoun case is held constant on the finiteness test. On the third test, Case-Finiteness,

nominative case pronouns occur with finite verbs and non-nominative case pronouns occur with non-finite verbs.

The Verb Finiteness task used a sample of 48 children with a mean age of 4;10. An example from the Verb Finiteness test is as follows:



Dog puppet: He kicked a ball.

Turtle puppet: He kick a ball.

Test Administrator: Who said it better, the dog or the turtle?

The same set-up is used for all three experiments.

As can be seen in Table 5, results of this task show that children had an overall 81.364% correctness, showing slightly better results in the past tense -ed (86.85)%) as compared to the Aux be (75.86%). Results also showed that aux be and –ed judgments correlated with one another.

	Past tense –ed	Aux be	Overall Average Score
3 year olds n= 9	78.41% correct	68.18% correct	73.30% correct
4 year olds n= 24	87.50% correct	75.83% correct	81.67% correct
5 year olds n= 15	91.18% correct	80.88% correct	86.03% correct

Table 5 - Overall results of the Verb Finiteness Task by age (Donnellan 2010, p. 30, Figure 4)

According to Donnellan, the results of this task are consistent with generativist arguments that multiple finiteness markers show correlation over time (e.g. Rice, Wexler & Hershberger 1998) and are inconsistent with constructivist conceptions of language development (e.g. Conti-Ramsden, Joseph, Lieven & Serratrice 2008), which assume that co-occurrence in the input is responsible for whatever contingencies children manifest in their speech.

The Pronoun Case Task used the same sample of 48 children with a mean age of 4;10 and used the same procedure with different test questions. Children were asked to choose between sentences that had either a nominative or an accusative pronominal subject, both of which always occurred with a finite verb, in order to hold verb finiteness constant, as in the following example.

Cat puppet: He is a dog.

Turtle puppet: Him is a dog.

The results of this task show a 81% rate of correctness, with similar mean percentages for she-her (79.66%) compared with he-him (79.45%). Table 6 provides a breakdown of results by age.

	She-Her	He-Him	Overall Average Score
3 year olds n= 9	58.75%	68.75%	63.75%
4 year olds n= 24	80.86%	80.08%	80.47%
5 year olds n= 15	89.71%	84.56%	87.13%

Table 6 - Overall Results of the Pronoun Case Task by age (Donnellan 2010, p. 34, Table 3.1)

Donnellan observes that judgments of she-her and he-him are correlated (r=.429) when age is partialed out. The results of this study were consistent with generativist theories that propose that finiteness and case are crucially linked and show that children prefer nominative case subjects over accusative case subjects paired with inflected verbs.

The third experiment, the Case-Finiteness Task, used the same sample of 48 children with a mean age of 4;10 and used the same procedure as the first two experiments, however in this test nominative pronouns went with finite verbs and non-nominative pronouns went with nonfinite verbs and children had to choose between nom/finite and non-nom/nonfinite combinations each time. Object case was also tested. Table 7 shows a breakdown of results by age:

	3rd –s	"am"	Past –ed	Object Case	Overall Average Score
3 year olds n=9	80.30%	78.79%	76.62%	79.55%	78.66%
4 year olds n=24	86.11%	88.89%	81.55%	87.50%	85.69%
5 year olds n=15	86.67%	92.22%	86.67%	93.33%	89.28%

Table 7 - Overall Results of the Case-Finiteness Task by age (Donnellan 2010, p. 35, Table 3.3)

One of the most important finding in Donnellan's study was that the results of finiteness test and the results of the pronominal case test correlated ($r = .329$, $p = .024$, with age partialed out). These findings are consistent with the generativist approach, showing that children preferred sentences with nominative case pronouns and finite verbs. In addition, results suggested a correlation between verb finiteness and subject pronominal case.

Section 1.2: Empiricist Approaches to the Problem

Constructivist theories argue that, contrary to generativist views, a child's grammar is a reflection of a gradual accumulation of lexical knowledge. The previously discussed generativist ATOM model (Schütze and Wexler 1996) is the most prominent of the generativist proposals on case and finiteness in child language and consequently, constructivists concentrate much of their time attempting to discredit specific parts of the model. For example, the ATOM hypothesizes that children will demonstrate similar patterns of provision across many different tense-marking morphemes. Pine, Conti-

Ramsden, Joseph, Lieven and Serratrice (2008) aim to offer counter evidence to this claim, coming at the issue from a constructivist view and arguing that the rate of provision of tense-marking morphemes is actually the product of gradual learning.

To provide evidence against the ATOM, Pine et. al (2008) study the rates of provision of three different tense-marking morphemes: third person singular present tense, first and third person singular forms of copula BE, and first and third person singular forms of auxiliary BE. The data they study comes from audio-tapes, recorded at the homes of twelve children (ages at the beginning of the study ranging from 1;8.22 to 2;0.25 and at the end ranging from 2;18.15 to 3;0.10), all of whom are from English-speaking homes.

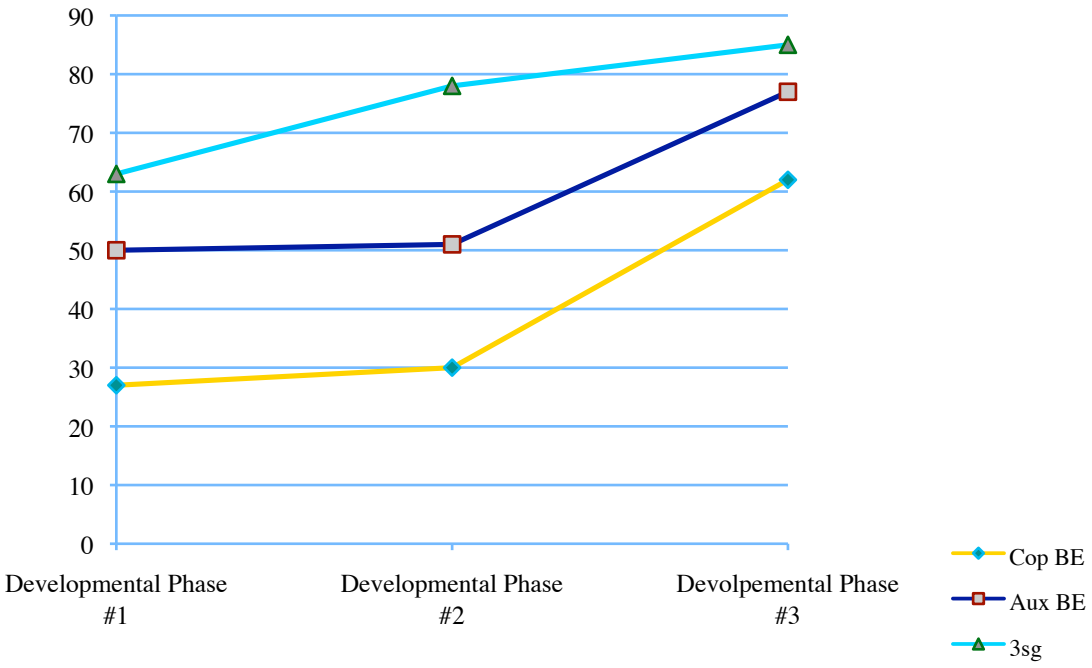


Figure 1 - Mean levels of provision of third person singular copula BE, third person singular auxiliary BE and third person singular present tense, compiled from Pine et al (2008)

When analyzed, the data produced by these children show that although the rates of provision of all three of the morphemes increase over time, children consistently produce 3rd person copula BE at slightly higher rates than Auxiliary BE and even higher rates than 3sg present tense, as illustrated in Figure 1.

As can be seen, this data provides evidence there are systematic differences in the rates at which children produce these three tense-marking morphemes. As such, this study provides evidence that Pine et al take to be inconsistent with the predictions of the ATOM model, though a larger question which they leave unaddressed is whether these rates of provision are correlated, as ATOM predicts.

Providing further evidence against the ATOM model is Pine, Rowland, Lieven and Theakston (2005). In this study, ATOM's main hypotheses that children will produce very few non-NOM subjects with agreeing verbs comes under heavy criticism, with several problems with the model being identified. The first of these problems is that the ATOM model is very hard to test; that is to say that there is a high level of confusion among researchers on how to explicitly test the predictions that the ATOM makes. Further, there are very limited existing data sets that can be used to provide evidence for the model. In fact, Pine et. al (2005) argue that the only data prior to their study able to be used to test the ATOM is in Schütze (1997) and Schütze and Wexler (1996) with a child named Nina. Of the three children that they tested for this experiment, only her 3psg data contains an expected rate of over 10% of agreeing verbs with non-NOM subjects, as would be predicted by a chi-square test. In order to provide further data to test the ATOM model, a study is conducted using audio-recordings from 12 English speaking children between the ages of 1;8.22 and 3;0.10. However, of these children,

only 3 produce a large enough number of non-NOM subjects to be useful: Anne, Becky and Gail. As the ATOM predicts, all 3 of the children produce very low rates of agreeing verbs with non-NOM subjects. However, as illustrated in Table 8, it is also shown that out of the 3 children, none of them produced an expected rate of non-NOM subjects with agreeing verbs that was well over 10%, and thus do not allowing for proper testing of the ATOM model.

Anne		
Agreeing	141 (139.48)	5 (6.52)
Non-agreeing	73 (74.52)	5 (3.48)
Expected Rate of Agreeing verbs	with Non-NOM subjects= 4.5%	
Observed Rate of Agreeing verbs	with Non-NOM subjects=3.4%	
Becky		
Agreeing	239 (241.38)	16 (13.62)
Non-agreeing	80 (77.62)	2 (4.38)
Expected Rate of Agreeing verbs	with Non-NOM subjects= 5.3%	
Observed Rate of Agreeing verbs	with Non-NOM subjects=6.3%	
Gail		
Agreeing	146 (138.32)	13 (20.68)
Non-agreeing	48 (55.68)	16 (8.32)
Expected Rate of Agreeing verbs	with Non-NOM subjects= 13.0%	
Observed Rate of Agreeing verbs	with Non-NOM subjects=8.2%	

Table 8- Distribution of NOM/non-NOM 3psg subjects with/without agreeing verb forms for Anne, Becky and Gail (expected values in parenthesis) from Pine, Rowland, Lieven and Theakston (2005, p. 280, Table 6

When these results are broken down further, it is shown that non-NOM feminine subjects occur at a much higher rate than non-NOM masculine subjects. In addition, when the children's expected rates of agreeing verbs with non-NOM subjects is isolated, it is found that this rate is much higher than the ATOM would predict. The children produced a wide variety of these types of utterances such as those given in (5) – (7).

(5) Anne

a. Him doesn't.

b. And her has.

c. I think her was crying for me.

(6) Becky

a. Where does him go?

b. Her's sixteen, Mum.

(7) Gail

a. Her's go on this desk.

b. Him's go in.

Overall, Pine, Rowland, Lieven, Theakston (2005) argue that the ATOM model has a number of shortcomings. They point out the difficulty of testing it in a practical manner, and produce results that show that with agreeing verbs, feminine and masculine non-NOM subjects show rates of occurrence that are very different from expected rates. This follows from a constructivist explanation, which assumes that language is the result of lexical learning, without the aid of grammatical rules. In addition, they demonstrate that when certain areas of the data are focused on, the error rate of agreeing verbs with non-NOM subjects is much higher than the ATOM would predict. Ultimately, however,

given how few of their 12 children provide useful evidence, their use of spontaneous production data seems to limit their ability to test the theory that they disagree with.

Section 1.3 Pronoun Paradigms in Child Language

As illustrated in the constructivist work just discussed, some children are more disposed to making large numbers of case errors than others. Rispoli (2005) hypothesizes that errors occur when a child's pronoun paradigm builds quickly and out-develops their inflection on verbs that mark finiteness, and that not all children develop pronoun paradigms at the same rate. Consequently, some children will have a higher rate of making errors in pronoun case than others. Contrastingly, Rispoli (2005) hypothesizes that if a child's pronoun paradigm building proceeds at a more conservative rate, the risk of error of pronoun choice will decrease. Thus, pronoun case errors may be avoided if the rate of development of pronoun case grows in accordance with that of inflection. Rispoli's conclusions are based on his study of 44 children (20 boys and 24 girls) ranging in age from 2;0-4;0, all coming from homes where mainstream U.S. English is spoken. The children were recorded while playing and conversing with their primary caregiver for two one-hour sessions. The data was then transcribed, tested for reliability and coded for pronoun form. Results showed that among the 44 children, the rate of pronoun case error ranged from 0 to 0.70 (that is zero errors to 70% error). The errors were broken down into three basic types: the objective for nominative error (the most common type of error) (8,9, &10), the objective for genitive error (11 &12) and nominative overextensions (13,14 &15).

Stereotypic objective for nominative errors:

8. And her just goes

9. Pretend him is a cowboy

10. But them are all going

Objective for genitive errors:

11. This is him daddy

12. Then them go in them car

Nominative overextension errors:

13. This puppy does on he

14. I find he mouth

15. He closed he's eyes

Results further showed that, as predicted, objective for nominative errors are by far the most highly produced. It is also shown that there are no genitive for nominative over-extensions (Table 9).

Error	Mean	Range	S.D
Obj. for Nom.			
Him for He	0.05	0-.29	0.08
Her for she	0.05	0-0.37	0.11
Them for they	0.02	0-0.16	0.04
Obj. for gen.	0.02	0-0.26	0-0.5
Nom. for overextension	0.01	0.-0.08	0.02

Table 9-Distribution of Error Types (Rispoli 2005 Table 2, pg. 101)

Other measures taken in Rispoli (2005) included children's finiteness marking and a measure of diversity of pronoun forms attempted by the child (SDpro). When the correlations between these two factors are examined for correlation with age and error rate (Table 10), interesting patterns emerge.

	Age	MLU	IPSyn	Finiteness	SDpro
Error rate	0.139	0.045	-.0111	-0.378	-0.437
Age		0.382	0.393	0.288	-0.338
MLU			0.696	0.572	-0.295
IPsyn				0.618	-0.443
Finiteness					-0.330

Table 10- Correlation between error rate and age, finiteness and SDpro (Rispoli 2005, p. 102, Table 3)

The most important of these results shows that error rate stands unrelated to age, MLU or IPSyn. It does, however, correlate with finiteness (with $r=-.378$, $p<.05$) and SDpro (with $r=-.437$ and $p<.01$). Therefore, Rispoli (2005) concludes that error rate is more strongly correlated with SDpro than with finiteness. Further analysis showed, however, that SDpro and Finiteness explained different portions of the variation in the error rate, which shows that they are independent. It was also shown that they interacted.

Overall, this study reveals the importance of studying the development of a child's pronouns case from multiple perspectives: errors do not exist simply because the grammar of that child is immature. Instead, Rispoli (2005) argues that errors occur at a

high rate when a child attempts to produce the members of a pronominal paradigm at a level higher than their capacity. Again, that is to say that when a child's development of the pronoun paradigm outstrips their development of inflection, the chance of producing errors is highly increased.

Section 1.4 SLI and Case

Given what we have seen, namely, that finiteness and case appear to correlate in typically developing English-speaking children, it is worthwhile to see whether these children, who famously have difficulty with finiteness marking, will experience a concomitant difficulty with pronominal case. Rice, Wexler and Hershberger (1998) aim to dissect these questions about grammatical markings in children with SLI and in addition to attempt to fill gaps left by previous research about the Optional Infinitive (OI) stage and the Extended Optional Infinitive (EOI) stage in children with SLI. The OI period is typically defined as a period of time in which children display immature grammar, in the sense that they do not consistently mark tense on verbs. Rather, they may contemporaneously mark a verb as both finite and nonfinite. This period is simply extended in children with SLI to form the EOI. Gaps in previous research include questions pertaining to the length of the EOI period in children with SLI, when typically-developing children overcome their period of OI, and how children acquire morphemes (one morpheme at a time, or as a set of morphemes). Attempting to answer these questions, the researchers not only help identify possible clinical markers and better the understanding of grammatical markers of SLI but also add to the overarching question of how children acquire language.

Rice, Wexler and Hershberger (1998) follow three groups of children in their study: one group identified as having SLI, one group that is age-matched to these children (5N), and another group that is language-matched to them (3N), by mean length of utterance. The study is longitudinal, and the children are interviewed at six-month intervals. The 5N and 3N children are identified as "typically developing".

Conclusions reached by this study are broad. First, the investigation makes the influential discovery that there is no "catch up" period for children with SLI. That is to say that the children with SLI follow a period of development that is not only prolonged compared to typically developing children, but that they also exhibit a lower level of grammatical understanding that does not catch up to that of their typically developing peers as they mature. The study also posits that morphemes grow together and that patterns of change are similar among morphemes, a claim that is later contested by Pine, Joseph and Conti-Ramsden (2004). In addition, Rice, Wexler and Hershberger (1998) recognize that the presence of an EOI period is not the only possible grammatical marker for SLI and that the resolution of the EOI period does not bring the resolution of SLI, and thus more more research is necessary to futher understand the complexities of these issues.

Rice, Wexler, and Redmond (1999) create a follow up to Rice, Wexler, Hershberger (1998). Their study is groundbreaking in that it is the first longitudinal study of grammatical morphemes in children with (SLI) and thus aims to further evaluate grammaticality judgments of children with SLI. The study uses a grammaticality judgment test that is designed to measure "well-formedness" judgments and uses the same three groups of children described in the previous study: a group of children with

SLI, an age control group (5N) and a language control group (3N). The study takes place over a three-year period, assesses each child five times and uses a story description task.

Conclusions are straightforward: SLI children make judgments that reflect their morphological productions, as predicted by the EOI model. That is to say that SLI children are able to reject morphosyntactic errors that they are unlikely to produce in their own speech, whereas they are able to accept errors that they are likely to produce. This data supports the presence of an EOI period—demonstrating again that an OI is present in children with SLI, but during an extended time period—and also reaffirms that the EOI period can be used as a clinical identifier for SLI. Again, more research is necessary to better understand the manifestations of SLI.

As previously discussed, Schütze and Wexler (1996) add to the discussion of grammatical markers in children with SLI through the observation that there is an asymmetry in the production of non-nominative and nominative pronoun case in both typically developing children and children with SLI. To this end, they posit that nominatives appear with both uninflected and inflected verbs, whereas non-nominatives rarely appear with agreeing verbs. Following this hypothesis, Wexler, Schütze & Rice (1998) predict and provide evidence for the hypothesis that the three categories of inflection: agreeing verbs, ambiguous verbs and uninflected verbs, will show different rates of use of non-Nom subjects. Agreeing forms are defined to include main verbs with –s (e.g. likes) and agreeing auxiliaries and copulas (e.g. is/are). It is predicted that these forms will have the fewest (actually, in theory, none at all) non-NOM subjects. They predict that ambiguous verbs (in terms of Agr), which include past-tensed verbs (e.g. liked) and modals (e.g. can) to produce a greater number of non-Nom subjects than

agreeing verbs and finally that uninflected forms of verbs, such as main verbs missing –s (e.g. *Mary like), omitted auxiliaries and copulas (e.g. *Mary going, *Mary pretty) and uninflected auxiliaries (e.g. *Mary be) should produce the highest number of non-Nom subjects.

To test this hypothesis Wexler, Schütze & Rice (1998) use data from a longitudinal study conducted by Rice and Wexler which includes three groups of test subjects: an SLI group, an age-matched group (5N) and a language matched group (3N). Two types of data are used: spontaneous production data, which is to say data that is collected by recording the child during natural production, and an elicited production test. The results of examining this data collected from the spontaneous productions are as follows (Table 11)

	M	SD	n	M	SD	n
3N group						
Inflection						
Agreeing	8	25	20	13	28	20
Ambiguous	8	25	17	18	32	19
Uninflected	28	38	20	30	39	17
SLI Group						
Agreeing	26	29	16	13	31	21
Ambiguous	35	44	17	20	28	18
Uninflected	52	40	20	28	36	18

Table 11-Percentanges of non-NOM 3Sg Subject Pronouns in Spontaneous Utterances, Broken Out by Inflection (n=the number of children contributing to the analysis) (Wexler, Schütze & Rice 1998)

Note that, in general, with both the SLI and 3N group, the rate of non-Nom subject pronouns is highest with the uninflected utterances, lower with the ambiguous utterances and lowest with the agreeing utterances. Their experimental probe tests mirror these results (Table 12):

	M	SD	n	M	SD	n
3N group						
Inflection						
Agreeing	1	3	16	7	17	18
Uninflected	12	32	10	60	55	5
SLI group						
Agreeing	16	22	10	11	21	11
Uninflected	57	44	16	79	36	14

Table 12- Percentage of non-NOM 3sg Subject Pronouns in Probes, Broken Out by Inflection (n=the number of children contributing to the analysis) (Wexler, Schütze & Rice 1998)

Again, note the higher number of non-Nom subject pronouns that occur with uninflected utterances. Consequently, Wexler, Schütze & Rice (1998) conclude that the

data provides evidence supporting their hypothesis—non-Nom subjects most commonly occur with uninflected forms of verbs, sometimes appear with ambiguous verb clauses and least frequently appear with agreeing verbs. Note that so far it has been established by Rice, Wexler and Hershberger (1998) and Rice, Wexler and Redmond (1999) that children with SLI show difficulties with verb finiteness and that Wexler, Schütze Rice (1998) demonstrate that children with SLI also have difficulties with case.

Pine, Joseph and Conti-Ramsden (2004) come at the issue from a different angle, concentrating more on disproving the ATOM model as it pertains to SLI than creating new or alternative theories. They attempt to test ATOM's proposal that nonNOM subjects will so rarely occur with agreeing verbs that they can be reasonably discarded--which has been previously established as a key element of the model. To do this, they examine the actual frequency that children with SLI produce nonNOM subjects with agreeing verbs and compare this with the expected frequency of such error occurring by mere chance in spontaneous production data. Their study initially includes four children with SLI, but only three of the four used any nonNOM subjects in their speech, and only two of those three produce agreeing verbs with their nonNOM subjects significantly less than would be expected by chance. This being said, it is obvious that this data provides further evidence as to why this spontaneous production data is not the best method to study children's understanding of pronoun case: they simply do not encounter enough of the target type of utterance to be able to draw meaningful inferences. This study has to disregard twenty-five percent of its participants because the child does not produce any nonNOM subjects, and yet another twenty-five percent because the child did not produce

any nonNOMs with agreeing verbs. That means that fifty-percent of their already small pool of subjects is automatically excluded from the study.

The data produced by Pine, Joseph and Conti-Ramsden (2004) shows that the two children who remained in the study produce few nonNOM subjects with agreeing verb forms--data that is at face value supportive of the ATOM model. However, they argue that this is only the case if one looks at contracted and uncontracted verb forms combined. If the two forms are separated, only contracted verb forms offer evidence in support of ATOM, because they do not occur with non-nominative pronouns, whereas un-contracted verb forms offer counter-evidence to it, as they do occur with non-nominative pronouns. However, note that this conclusion is based on limited spontaneous production data from only two children, allowing for the question of the validity of its methods and results.

Summarizing, Mainstream Generative Grammar assumes a connection between finiteness and case, as stated in Case Theory (Chomsky 1981). Child English speakers produce inconsistent finiteness marking, which, by Case Theory, should produce inconsistent pronominal case marking in subject position. There is spontaneous production evidence that this is true. Further, Donnellan (2010) gives receptive evidence for this connection, controlling for age. What remains to be proven is whether the connection between case and finiteness can be substantiated, controlling for general language development. I now turn to showing that an experiment measuring children's knowledge of Binding Principles A & B can be carried out in the same Grammaticality Choice Format as was used in Donnellan's experiments. Later, I will report an experiment that tests case, finiteness and the Binding Principles with the hope of showing

that the finiteness-case connection persists, with no connection to the Binding Principles, suggesting that the finiteness-case conection is not a function of general language development.

Chapter 2: Experiment 1- Grammatically Choice Experiment: The Binding Principles

Section 2.0: Introduction

We chose to test children's knowledge of a grammatical ability described in Chomsky (1981) as the Binding Principles, specifically Principles A & B, in order to examine their correlation with Case Marking and Verb Finiteness. Given that earlier work has shown that verb finiteness and case judgments correlate (cf. Rispoli 2005, Donnellan 2010), such correlations would be more convincing if we could show that neither verb finiteness nor case judgments correlate with some other aspect of grammatical knowledge, such as the binding principles, that develops independently.

Chien and Wexler (1990) study the development of child English-speakers' understanding of the Binding Principles. They perform four experimental studies to test children's knowledge of two linguistic principles: Principle A and Principle B. The goal of their study is to discover children's knowledge of Binding Theory. Binding Principle A dictates that a reflexive pronoun (such as himself) must be locally bound, that is to say that is must have a local antecedent in the same clause, which must c-command the reflexive. In contrast, Principle B says that pronouns may only refer to a non-local antecedent, which must also c-command the pronoun. The first three experimental

studies preformed are designed to test these two linguistic properties, whereas the final experiment tests the hypothesis that children do have understanding of Principle B and lack understanding of the pragmatic Principle P. Principle P expresses the idea that coreference between two NPs can always be forced by context. Throughout the experiments two different methods are used—the Yes/No Judgment task (YNJ task) and the Act Out task (AO task) — both are used to gauge children's understanding of sentences including reflexives or pronouns.

The first experiment aimed to test children's knowledge of the locality constraint of Principle A and also to test Principle B through using pronouns alternately with reflexives. The sentences given contained two possible antecedents for the reflexive, but only one was local. For reflexive sentences, adults were expected to choose the local antecedent as correct whereas for the pronoun sentences they were expected to choose the non-local antecedent as correct. The test used three types of sentences: reflexive sentences (16), pronoun sentences (17) and gender control pronoun sentences (18)

(16) Kitty says that Sarah should point to herself

(17) Kitty says that Sarah should point to her

(18) Snoopy says that Sarah should point to him

A version of the AO task, called the Simon-says game is used in this experiment. Two puppets are held up (Kitty and Snoopy) and the child is supposed to act out what Kitty and Snoopy say when they hear "Kitty says" or "Snoopy says".

The results for subjects' correct responses to reflexive sentences (e.g.

understanding herself to be the child Sarah in sentences like "Kitty says that Sarah should point to herself) show that children older than 6;0 (the G8 group) know the major properties of reflexives, and respect Principle A, at close to adult-like levels—that is, that the antecedent must be local.

The subjects' correct responses to the pronoun sentences (e.g. understanding the pronoun her to be the puppet Kitty in sentences like "Kitty says that Sarah should point to her") indicate that children in the age group 6;0-6;6 (G8) still do not show steady behavior predicted by Principle B grammaticality judgments. That is to say that whereas children ages 6;0-6;6 demonstrate knowledge of Principle A, they appear to lack that knowledge of Principle B. However, in the subsequent experiments, Chien and Wexler will go on to hypothesize that it is not the understanding of Principle B that the children lack; it is the pragmatic Principle P. Experiment 2 was designed to test infinitival structures and to use gender control for reflexives. Four sentence types were used: reflexive sentences as in (19), pronoun sentences as in (20), GC reflexive sentences as in (21) and GC pronoun sentences as in (22).

(19) Kitty wants Sarah to point to herself.
(20) Kitty wants Sarah to point to her.
(21) Snoopy wants Sarah to point to her.
(22) Snoopy wants Sarah to point to him.

This experiment used the same format as the Simon Says task except using that it used the word "want" instead of the word "says" that was used in Experiment 1.

Experiment 2 replicated the results of experiment 1, showing that children over the age of 5;6 understand Principle A. The results concerning Principle B are also replicated. The major findings of experiment 2 show that once again, children seem to grasp the major properties of reflexives (Principle A) by the time they are 5;6, but still fail to grasp Principle B.

Experiment 3 is designed to test if the youngest children think that reflexives and pronouns need local antecedents. This experiment is designed to eliminate a potential response bias that may have occurred in the other two experiments. Four different sentence types were used: reflexive sentences (23), pronoun sentences (24), gender control reflexive sentences (25) and gender control pronoun sentences (26)

(23)Kitty says that Sarah should give herself a car.
(24)Kitty says that Sarah should give her a popsicle.
(25) Snoopy says that Sarah should give herself a cup.
(26) Snoopy says that Sarah should give him a whistle.

This experiment found that children older than 4;6 knew that the antecedent of reflexives must be local, showing, in comparison with Experiments 1 and 2, higher percentages of correct responses to reflexive sentences (say: 80.25% want:76.75% in the Party game as compared to say: 57.3% want: 57.3% in Simon Says). Children also appear to still allow for the violation of Principle B at age 6;6. In conclusion to the first three experiments, children seem to consistently show a developmental delay of Principle B as compared to Principle A.

However, Chien and Wexler hypothesize that, despite these results, children do actually have an understanding of Principle B and test this idea in their fourth experiment, using a Yes-No Judgment task. In this task, a picture is presented to the child, which they are to examine. After examination, the child is expected to answer a Yes/No question about the picture.

The results of this experiment show that when the question matched the picture children made correct judgments almost perfectly for all three question types. (Figure 5). However, a mismatch in question and picture causes a depression in the correct answers made for all three question types (Figure 6). As can be seen, adults in both situations made correct judgments in both situations.

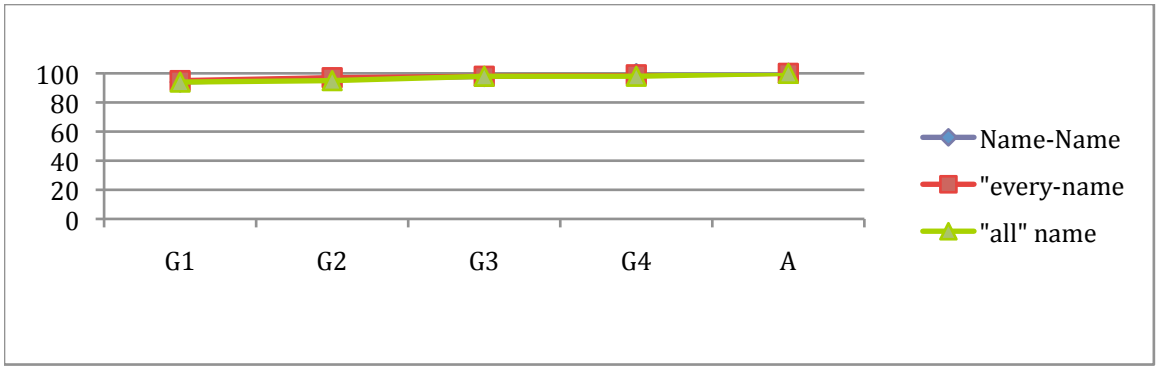


Figure 5-The results of the 3 match conditions (Chein and Wexler)

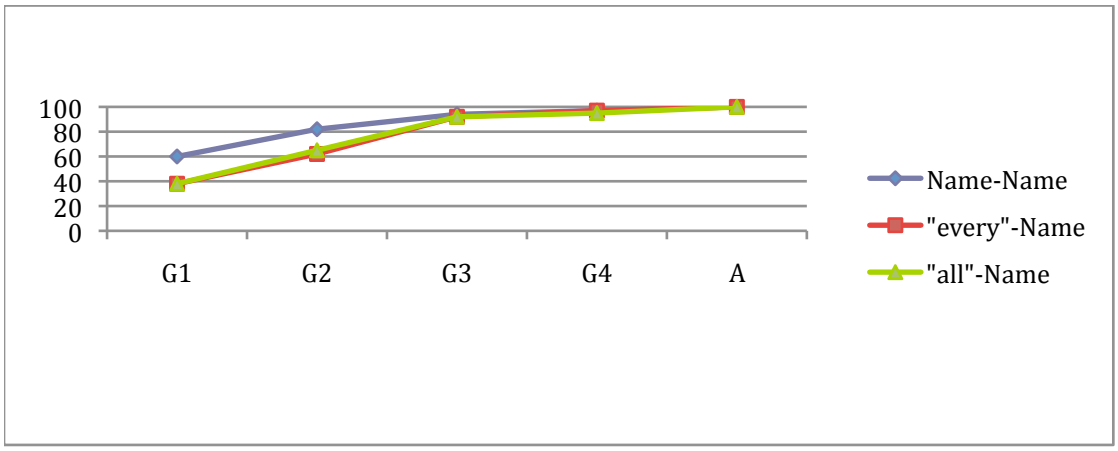


Figure 6-The Results of the 3 mismatch condition (Chien and Wexler)

Other results of the test mirror the results from the first two experiments (children understand Principle A between the ages of 5 and 6 but still appear to fail to understand Principle B). However, it is concluded that it is not Principle B that children are failing to understand; rather it is the pragmatic Principle P.

Overall, Chien and Wexler's experiments confirm the Lexical Learning Hypothesis. That is to say that by the time the child learns that himself is a reflexive and him is a pronoun, they are able to understand Principle A and Principle B and are able to indentify correct antecedents. In addition, although at face value their experiments show otherwise, Chien and Wexler claim that children do understand Principle B.

Building on the conclusions of Chien and Wexler (1990), Sekerina, Stromswold and Hestvik (2004) make an interesting addition to this ongoing study of pronouns. They aim to dissect the question of how adults and children process referentially ambiguous pronouns. A referentially ambiguous pronoun can be understood by examining the following example (Sekerina, et al 2004, p 124.)

(27) The boy has put the box behind him.

In this example, the pronoun him can refer to one of three things: it can be coreferential with a sentence external referent, it can refer to a discourse referent that is not specified in the sentence, or it can refer to the sentence-internal referent, which is the boy. Therefore, the pronoun is referentially ambiguous as to whom it refers. Interestingly, the sentence-internal referent (the boy) is the intuitive choice in this construction, referred to as Short Distance Pronouns (SDP) by Tenny (1999), cited in Sekerina et. al (2004). It is theorized that this sentence-internal referent is favored due to its close proximity. Sekerina et. al (2004) aim to provide insight into this phenomenon by examining how adults process unambiguous reflexive sentences and ambiguous pronoun sentences as they relate to a picture shown to the subject, and how children comparatively perform the same task. To do this, they use both a pencil-and-paper survey style test and an eye-tracking test that gives an idea of the thought processes of the subject through the task.

In the paper-and-pencil task, adults clearly favor the sentence-internal referent for the pronoun, as can seen by Table (1). However it is interesting that although the majority of adults chose the sentence-internal referent (79%), an additional 22% still chose the sentence-external referent, although it is theoretically more difficult to access. These results were mirrored in the eye-tracking test for adults. However, during the eye-tracking movement tests, the pronoun condition sentences resulted in significantly fewer looks to the sentence-internal referent than in the reflexive condition. This indicates that there was competition between the internal and external referents and that the adults were aware of this competition and were working to resolve it.

	Sentence-Internal	Sentence-External	Both
Reflexive	95	5	0
Pronoun	79	17	4

Table 13: Adult referent preference questionare: overall sentence-internal referent preference (%) (Sekerina et al. 2004, p. 133, Table 1)

When children (aging in range from 4;9-7;10) were given a slightly shortened version of the tests, they also chose the sentence-internal referents, as can be seen in Table (2). However, their eye movements indicate that toward the end of the test, children become aware of the ambiguity. It is therefore very interesting that despite becoming aware of the ambiguity, their awareness did not affect their final decision as it did with adults—an overwhelming 93% of children still chose the sentence-internal referent for the pronoun.

	Sentence-internal	Sentence-external
Reflexive	94	6
Pronoun	93	7

Table 14: Children eye-tracking experiment (N=16):overall sentence-internal referent preference (%) (Sekerina et. al (2004, p. 145, Table 4)

Overall, this study reveals that there are differences in the way that adults and children process and resolve pronoun ambiguity. Adults recognize it and begin to resolve it, whereas although children reflect the same bias toward sentence internal referent, they are slower to recognize it and are hesitant to change their initial judgments

even after recognition of ambiguity. These results mean that although children are not yet explicitly aware of their recognition of pronoun ambiguity, their eye movements suggests that they are on some level implicitly aware that the ambiguity exist
In summary, Chien & Wexler show that children have an understanding of Principle A from a relatively young age. This is confirmed by Sekerina et al. Interestingly, while Chien & Wexler showed relatively weaker command of Principle B, Sekerina et al provide eye tracking results suggesting that children may know more about Principle B than previously suspected.

Chapter 2: Experiment 1- Binding Principle Experiment

Section 2.0 Introduction and Experimental Overview

Again, it has been previously established that in typically developing children, judgments of verb finiteness correlate with judgments of subject pronominal case-marking (Donnellan 2010). While this correlation is of interest, it would be much more convincing if it were also shown that the development of finiteness did not correlate with every aspect of developing grammar. In order to show this we will measure a theoretically unrelated grammatical construction, to wit, the Binding Principles, as they relates to the pronouns him and himself, , which have no plausible relevance to verb finiteness Binding Principles A and B have been shown to develop until at least 6;0 years of age, which will serve as the maximum age in our sample (Chien and Wexler, 1990).

There have been different results in the previously discussed literature regarding the development of pronouns (him) and reflexives (himself) in child grammar. Chien and Wexler (1990) found evidence that reflexives are the first to develop and Sekerina (2004)

showed that reflexives seem earlier, although some mixed results were seen between the off-line and on-line tasks. We believe that that we have found further evidence that reflexives develop before pronouns in our research.

Section 2.1 Method

Participants

Experiment 1 for the Binding Principle selected 43 participants from a daycare in central Ohio ranging in age from (3;3 – 5;11). The participants included eight 3 year-olds, twenty-three 4 year-olds and twelve 5 year-olds. The mean age was 4:7. 10 additional children were excluded from the data for failing to pass 4 out of 5 fillers items. Once parental consent was obtained and the child agreed to participate in the study, the Grammaticality Judgment test was administered at the daycare center during regular hours. Children were given one of three orders of the test, Order A, B, or C, in which the order of the pictures was varied.

Procedure

The experiment used the Grammaticality Choice format (Pratt & Grinstead 2007). For this test, the child was introduced to two puppets, Mr. Pig and Mr. Elephant. It was explained to the child that the puppets were babies and sometimes did not say things right and that the child was going to help them learn to talk correctly. It was further explained that Mr. Pig and Mr. Elephant were both going to say something about a picture, and the

child had to tell them “who said it better”. The test consisted of 5 warm-up items in which the child was praised if they chose the correct answer. If the child chose the incorrect answer, the question was repeated, asking the child to listen carefully. If the child still chose the incorrect puppet, the administrator then explained to the child why the correct answer was correct. During the filler and experimental items, the child was praised regardless of whether or not they chose the correct answer. The test contained five warm-up questions and five filler items. The fillers served as a means to make sure the child understood the format of the test and was paying attention throughout. An example of the filler item is as follows:

The dog thinks that the apples are in the tree.

*The dog thinks that the apples are on the ground.

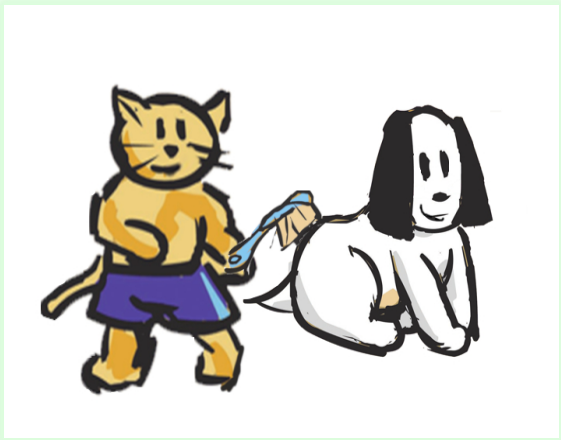
The experimental items consisted of 9 himself items and 9 him items, which were presented with the five filler items scattered throughout. The experimental items are set

up in the same format as the warm-up and filler items. It is important to note that the test was designed so that the elephant/pig is not always right and the first animal to talk is not always right, so as to discourage the child from trying to create any strategies in choosing the right answer. Ordering effects, such as which puppet spoke first and which puppet was correct, showed had no effect (p= .670). An example of the reflexive himself and pronoun him items are as follows:

Himself:

The turtle thinks that the cat is brushing himself.

*The turtle thinks that the cat is brushing him



Him:

The dog thinks that cat is brushing him.

*The dog thinks that the cat is brushing himself.

Reference Appendix A1 for a complete list of stimuli images and Appendix B2 for a complete list of sentences.

Section 2.2: Results and Discussion

The Binding Principle test showed an overall rate of 66% correct (516 of 774 total items). Him showed a correctness rate of 62% (238 of 387 him items correct) and himself showed a slightly higher correctness rate of 72% (278 of 387 himself items correct). Table 15 shows the results broken down by age, which are also shown in Figure 7.

	him	himself
3 year-olds (n=8)	38/72 – 53%	43/72 – 60%
4 year-olds (n=23)	128/207 – 62%	152/207 – 73%
5 year-olds (n=12)	72/108 – 67%	83/108 – 77%
total	238/387 – 62%	278/387 – 72%

Table15: *Him* and *Himself* results broken down by age

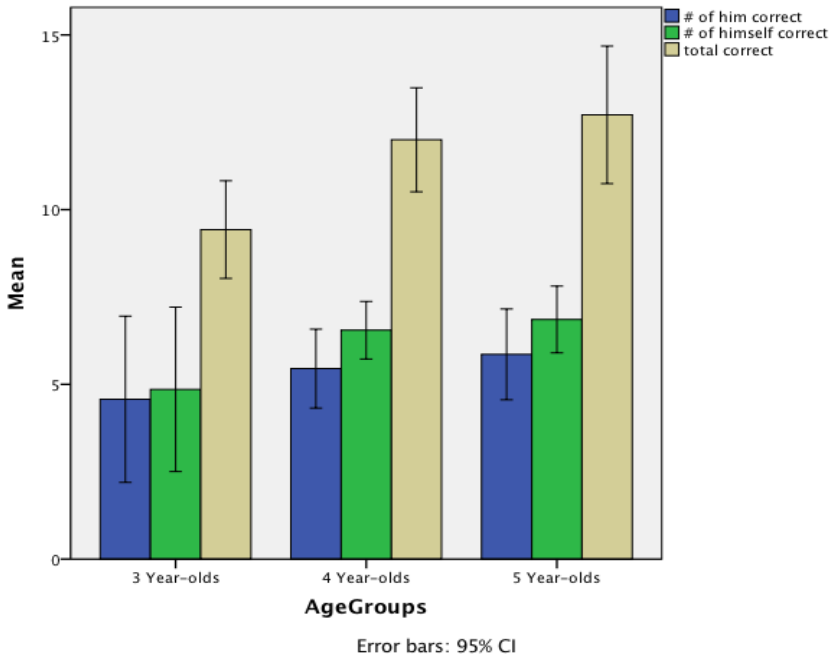


Figure 7: Him and Himself results broken down by age

This data shows that age and total correct are close to correlating, with r=.267 and p=.087. However, when we remove two influential outliers, we begin to see a stronger correlation between the two variables of age and correctness, with himself giving us the stronger correlation (him and age, r = .230, p = .147, himself and age, r = .332, p = .034 and total correct and age, r = .374, p = .016, n = 41). This suggests that binding knowledge (of at least himself) does indeed improve with age.

Section 2.3 : Summary and Conclusion

Overall, our experiment shows that binding knowledge (of at least himself) correlates with age. If finiteness and case correlate with age partialed out, and that binding (himself) does not correlate with finiteness, then the connection between inversion and case will be much stronger and more convincing. In order to demonstrate this, we created a second test.

Chapter 3: Experiment 2- Grammaticality Choice Experiment: Finiteness, Case, Subject-Auxiliary Inversion and Binding

Section 3.0 Introduction and Experimental Overview

To compile this test, we found the "best" items from 6 tests (most highly correlated with other items from the same test and from other tests). After finding these "best" items, our new compiled test consisted of the 4 best pronoun and 4 best reflexive items from the Binding Principle Grammaticality Judgement Task ("best" meaning highest item-total correlation within this test itself), the 4 best items from the Finite Grammaticality Judgment Task (Ricci 2009), the 4 best items form Subject-Auxiliary Inversion Grammaticality Judgment Task (Ricci 2009), and the 4 best items from Pronoun Case & 4 from Verb Finiteness Grammaticality Judgment Task (Donnellan 2010).

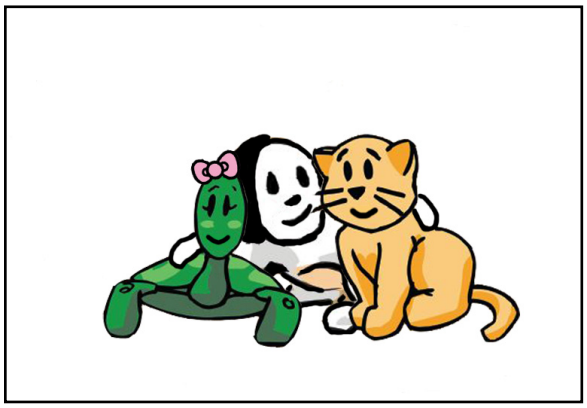
Section 3.1 Method

Participants

The Pilot Grammaticality Judgment Test selected 44 participants from a daycare in central Ohio ranging in age from (3;6-6;2). with 8 additional children who were excluded from the data for failing to pass 4 out of 6 fillers items. Once parental consent was obtained and the child agreed to partake in the study, the Pilot Grammaticality Judgment Test was administered at the daycare center during regular hours. Children were given one of three orders of the test, Order A, B, or C, in which the order of the pictures was varied.

Procedure

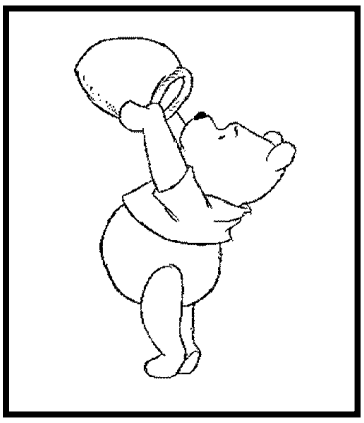
This test followed the same procedure as the Binding Principle Test, but used two different puppets: “Mr. Eagle” and “Mr. Raccoon”. The filler and warm-up items tested knowledge of “s” and “ing”. The test consisted of 6 warm-up items and 6 filler items. The test was made up of the 4 “best” pronoun and 4 “best “reflexive items from Binding Principle Grammaticality Judgment Task (in this case, “best” means highest item-total correlation within this test), the 4 “best” items from Finite Grammaticality Judgment Task (Ricci 2009), the 4 “best” items from Subject-Auxiliary Inversion Grammaticality Judgment Task (Ricci 2009), and the 4 “best” items from Pronoun Case & 4 from Verb Finiteness Grammaticality Judgment Task (Donnellan 2010) (in these cases, “best” means the highest correlations among items on previously given test). The inversion items are not the focus of this paper. Again, the same procedure as the Binding Experiment was followed. An example of a filler item is a follows:



The dog had two friends

*The dog had two friend

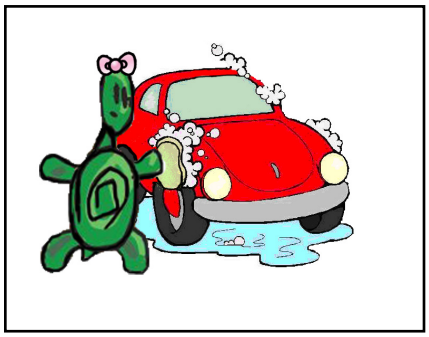
An example of an inversion item is as follows:



Why is Pooh looking in the pot?

*Why Pooh is looking the pot?

An example of an case item is as follows



She cleans the car

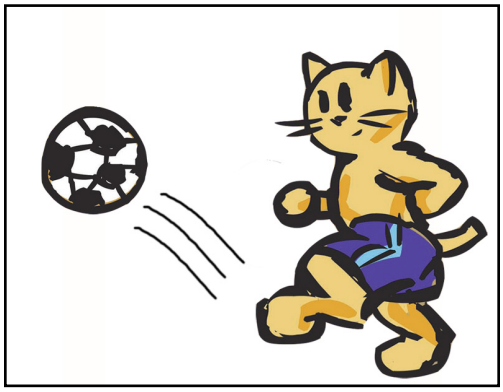
*Her cleans the car

An example of an Finiteness I item is as follows

Mr. Cowboy is riding a horse

*Mr. Cowboy riding a horse

An example of an Finiteness C item is as follows:



He kicked a ball

*He kick a ball

Reference Appendix A2 for a complete list of stimuli images and Appendix B2 for a complete list of sentences.

Section 3.2: Results and Discussion

The Integrated Test showed that case and finiteness demonstrated a near correlation, with r= .282 and p= .067. Although case and finiteness only demonstrate this marginal correlation, the argument for a stronger correlation can be made by examining the results of Donellan (2010), which show a strong correlation between the two (r = .329, p = .024, with age partialed out). Additionally, the Integrated Test only used 4 of each type of item. We are confident that, as Donellan 2010 demonstrated, this correlation would become stronger with an increased number of test items and/or participants. Also importantly, case was not shown to correlate with either *himself* (r =.123 and p=.433) or *him*, (r= .104 and p=.506). Finiteness also showed no correlation with *him (*r= .004 and p=.977) or *himself* (r =.038 and p=.810). This, along with the correlations seen in the four other aspects of grammar that were measured by the test, are shown in Figure 8. Figure 9 shows the mean correct items for all 6 types of items. The correlations involving inversion are discussed in Hall (2011).

Correlations

Control Variables			# of case correct	# of fin. C correct	# of fin. I correct	# of him correct	# of inv. correct	# of himself correct
Age	case	Correlation	1.000	.323	-.023	.039	.373	.064
		Significance	.	.035	.883	.803	.014	.683
		df	0	41	41	41	41	41
	fin. C	Correlation	.323	1.000	.170	.039	.387	-.054
		Significance	.035	.	.276	.803	.010	.731
		df	41	0	41	41	41	41
	fin. I	Correlation	-.023	.170	1.000	.312	.267	.067
		Significance	.883	.276	.	.042	.084	.671
		df	41	41	0	41	41	41
	him	Correlation	.039	.039	.312	1.000	.017	-.080
		Significance	.803	.803	.042	.	.916	.612
		df	41	41	41	0	41	41
	inv.	Correlation	.373	.387	.267	.017	1.000	.184
		Significance	.014	.010	.084	.916	.	.239
		df	41	41	41	41	0	41
	himself	Correlation	.064	-.054	.067	-.080	.184	1.000
		Significance	.683	.731	.671	.612	.239	.
		df	41	41	41	41	41	0

a. Cells contain zero-order (Pearson) correlations.

Figure 8: Correlations demonstrated among aspects of grammar on the Integrated Test

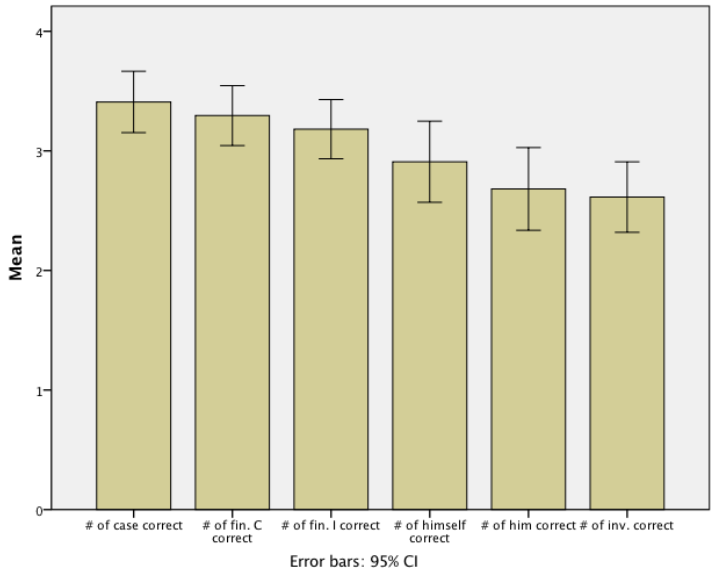


Figure 9: Mean total correct of items on the integrated test.

Section 3.3 : Summary and Conclusion

Again, it has been suggested that a relationship exists in the manner that case and finiteness develop in typically developing children (e.g. Schütze & Wexler 1996, Donnellan 2010). Additionally, there has been some progress in diagnosing SLI using finiteness (Rice & Wexler 1996). Through combining case, finiteness and Binding Principle items onto one receptive test, this experiment is able to show that this previously observed relationship between case and finiteness is not a reflection of an overall trend of language growth, but is rather, is a unique and distinct relationship. Thus, because case and finites uniquely correlate, case should be able to join finiteness as a diagnostic marker for SLI.

Next, this experiment will be replicated on an age-matched sample of children with SLI. The data from children with SLI will then be compared to the typically developing data gained from this experiment and the two sets of data will be examined for differences in verb finiteness and pronominal case marking judgment abilities. This will be done by comparing the group-internal scores for verb finites, case-marking and pronoun reference (Binding Principle) between the two sets of children, with age partialed out.

Again, this information will be added to the body of diagnostic knowledge and SLI, in hopes of creating a quicker and more reliable diagnostic process for the disorder. This will allow children with SLI to have access to crucial intervention at an earlier time.

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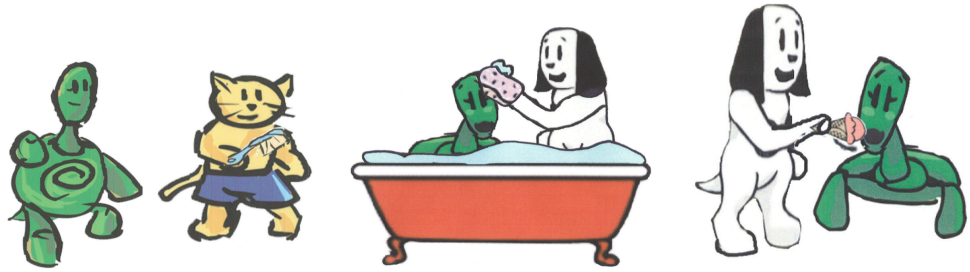
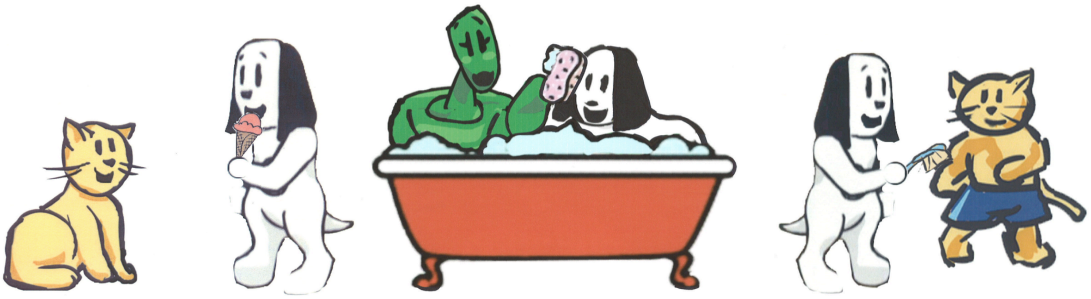
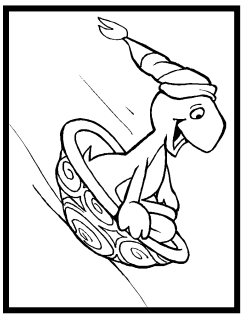
Chapter 5: Appendices

Appendix A1: Binding Principle Task Stimuli





Appendix A2: Combined Test Stimuli

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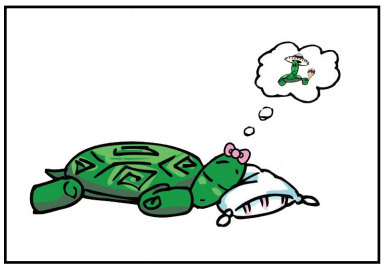

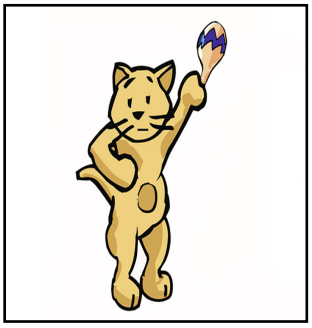

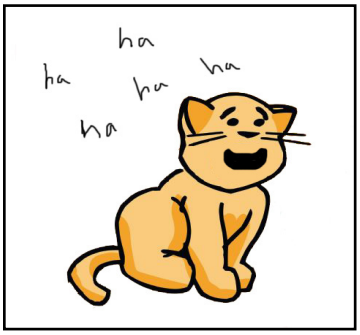
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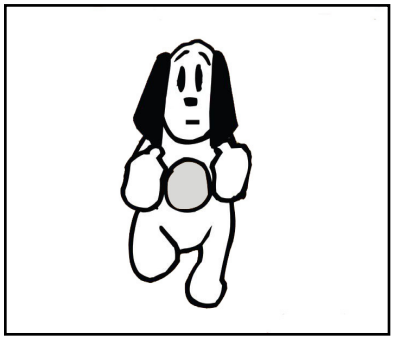

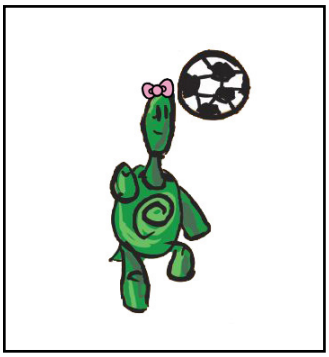

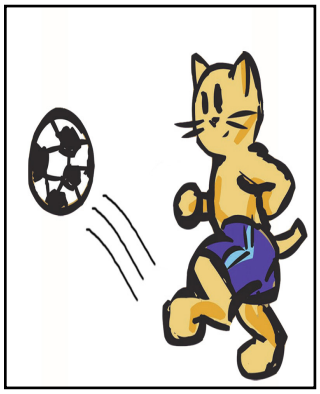

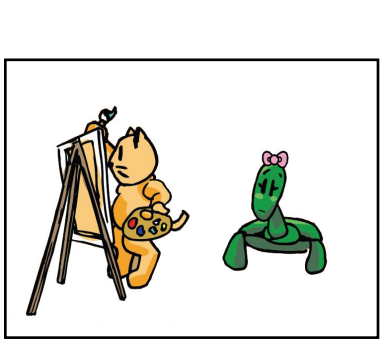

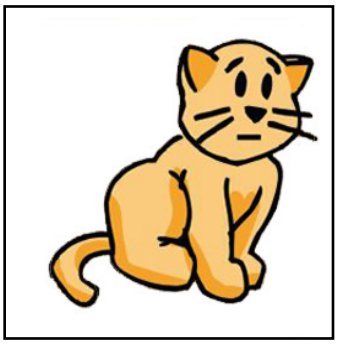

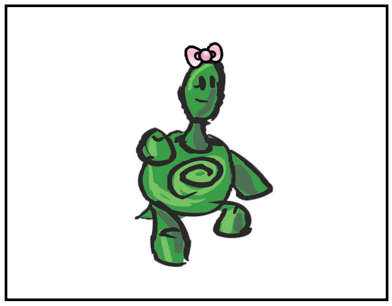

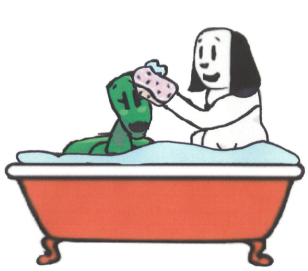

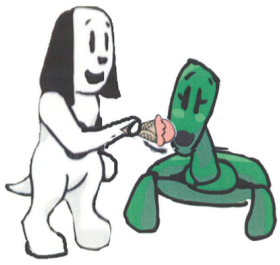

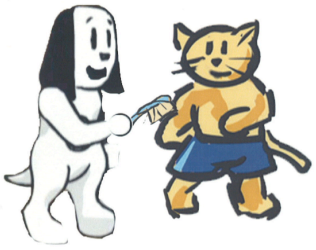

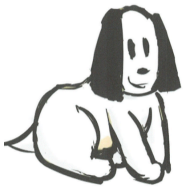

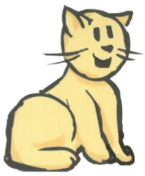

Appendix B1: Binding Principle Sentences:

#	Sent. Type	Sentences	
1	Warm-up	The dog thinks that the apples are in the tree.	
		The dog thinks that the apples are on the ground.	
2	Warm-Up	The cat thinks that the bees are out of the hive	
		The cat thinks that the bees are on the hive	
3	Warm-up	The turtle thinks that the grandparents are sitting on the floor	
		The turtle thinks that the grandparents are sitting on the couch	
4	Warm-up	The dog thinks that the spider is on the web	
		The dog thinks that the spider is beside the web	
5	Warm-up	The turtle thinks that the fish is in the bowl	
		The turtle thinks that the fish is under the bowl	
1	Filler	The dog thinks that the books are in the shelf	
		The dog thinks that the books are outside of the shelf	
2	Filler	The turtle thinks that the ball is in the sandbox	
		The turtle thinks that the ball is outside of the sandbox	
3	Filler	The cat thinks that the bananas are beside the bowl	
		The cat thinks that the bananas are in the bowl	
4	Filler	The cat thinks that the bird is flying over the fence	
		The cat thinks that the bird is flying under the fence	
5	Filler	The dog thinks that the man is under the cloud	
		The dog thinks that the man is over the cloud	
1	Exp	The dog thinks that the turtle is washing himself	
		The dog thinks that the turtle is washing him .	
2	Exp	The cat thinks that the turtle is washing him	
		The cat thinks that the turtle is washing himself	
3	Exp	The turtle thinks that the dog is	

		washing him	
		The turtle thinks that the dog is washing himself .	
4	Exp	The cat thinks that the dog is washing himself	
		The cat thinks thinks that the dog is washing him	
5	Exp	The dog thinks that the cat is washing him	
		The dog thinks that the cat is washing himself	
6	Exp	The dog thinks that the turtle is feeding himself	
		The dog thinks that the turtle is feeding him	
7	Exp	The turtle thinks that the dog is feeding himself	
		The turtle thinks that the dog is feeding him	
8	Exp	The cat thinks that the turtle is feeding him	
		The cat thinks that the turtle is feeding himself	
9	Exp	The turtle thinks that the cat is feeding him	
		The turtle thinks that the cat is feeding himself	
10	Exp	The cat thinks that the dog is feeding himself	
		The cat thinks that the dog is feeding him	
11	Exp	The dog thinks that the cat is brushing himself	
		The dog thinks that the cat is brushing him	
12	Exp	The turtle thinks that the cat is brushing himself	
		The turtle thinks that the cat is brushing him	
13	Exp	The dog thinks that the cat is feeding him	
		The dog thinks that the cat is feeding himself	
14	Exp	The cat thinks that the dog is brushing himself	
		The cat thinks that the dog is brushing him.	
15	Exp	The cat thinks that the turtle is brushing him	
		The cat thinks that the turtle is brushing himself	
16	Exp	The turtle thinks that the cat is washing himself	

		The turtle thinks that that cat is washing him .	
17	Exp	The dog thinks that the turtle is brushing him	
		The dog thinks that the turtle is brushing himself	
18	Exp	The turtle thinks that the dog is brushing him	
		The turtle thinks that the dog is brushing himself .	

Appendix B2: Combined Test Sentences:

1a. The cat is smiling.	Warm-up
1b. The cat is smile.	
2a. The dog sees two elephants	Warm-up
2b. The dog sees two elephant	
3a. The cat is wear shorts.	Warm-up
3b. The cat is wearing shorts.	
4a. The cat wants two apple.	Warm-up
4b. The cat wants two apples.	
5a. The girl is feeding the dog.	Warm-up
6a. The cat sees two bird.	Warm-up
16a. The dog was dance.	Filler
16b. The dog was dancing.	
12a. The turtle is singing.	Filler
12b. The turtle is sing.	
4a. The turtle is playing soccer.	Filler
4b. The turtle is play soccer.	
7a. The turtle wants two cookies.	Filler
7b. The turtle wants two cookie.	
8a. The dog is run.	Filler
8b. The dog is running.	
10a. The turtle thinks that the dog is washing him	
10b.The turtle thinks that the dog is washing himself .	Him
15a. The turtle thinks that the dog is feeding himself	
15b. The turtle thinks that the dog is feeding him	Him
18a. The turtle thinks that the cat is feeding him	
18b. The turtle thinks that the cat is feeding himself	Him
24a. The cat thinks that the dog	

is brushing himself	
24b. The cat thinks that the dog is brushing him.	Him
3a. Her is a turtle.	
3b. She is a turtle.	Case
5a. Him is orange.	
5b. He is orange.	Case
21a. She cleans the car.	
21b. Her cleans the car.	Case
18a. He watches the ball.	
18b. Him watches the ball.	Case
3a. He laughing.	
3b. He is laughing.	Fin C
6a. She is dreaming.	
6b. She dreaming.	Fin C
18a. He kicked a ball.	
18b. He kick a ball.	Fin C
15a. She watched a cat.	
15b. She watch a cat.	Fin C
16a. Where the baby turtle can swim?	
16b. Where can the baby turtle swim?	Inversion
3a. Why the puppy is scared?	
3b. Why is the puppy scared?	Inversion
9a. Where is the turtle sledding?	
9b. Where the turtle is sledding?	Inversion
19a. Why Pooh is looking in the pot?	
19b. Why is Pooh looking in the pot?	Inversion
27a. The boy row the boat.	
27b.The boy rowed the boat.	Fin I
24a. The boy rides the bike.	
24b. The boy ride the bike.	Fin I
13a. Donald angry.	
13b. Donald is angry.	Fin I
28a. Mr. Cowboy is riding a horse.	
28b. Mr. Cowboy riding a horse.	Fin I
The cat thinks that the turtle is feeding him	
The cat thinks that the turtle is feeding himself	Himself
The dog thinks that the cat is feeding him	
The dog thinks that the cat is feeding himself	Himself

The cat thinks that the dog is washing himself	
2. The cat thinks thinks that the dog is washing him	Himself
3.The dog thinks that the turtle is brushing him	
4. The dog thinks that the turtle is brushing himself	Himself